CLAIMS

1. A method of optimizing a network, comprising:

providing a switch card topology having a plurality of switching elements, wherein the plurality of switching elements are arranged to form a switch configuration;

providing N number of payload interfaces coupled to the switch configuration, wherein each of the N number of payload interfaces is coupled to interface with one of a plurality of payload slots;

providing a set of N payload module configurations, wherein the set of N payload module configurations is characterized by a sequential addition of a payload module into each of the plurality of payload slots, wherein the sequential addition of the payload module couples the payload module to the network; and

coupling the N number of payload interfaces to the switch configuration such that a latency function is minimized for the switch configuration and the set of N payload module configurations.

2. The method of claim 1, wherein the latency function is a root-mean squared latency function.

3. The method of claim 1, wherein the latency function is an arithmetic mean latency function.

4. The method of claim 1, wherein the latency function is a normalized root-mean squared latency function.

5. The method of claim 1, wherein the latency function is a normalized arithmetic mean latency function.

6. The method of claim 1, wherein the sequential addition comprises a first end to a second end sequential addition.

7. The method of claim 1, wherein the sequential addition comprises a second end to a first end sequential addition.

8. The method of claim 1, wherein the plurality of switching elements comprises M number of switching elements coupled to the N number of payload interfaces, wherein each of the M number of switching elements has a plurality of ports, and wherein the sequential addition comprises populating all of the plurality of ports on one of the M number of switching elements, one of the M number of switching elements at a time.

9. A method of optimizing a network, comprising:

providing a switch card having a plurality of switching elements, wherein the plurality of switching elements are arranged to form a switch configuration;

providing N number of payload interfaces coupled to the switch configuration, wherein each of the N number of payload interfaces is coupled to interface with one of a plurality of payload slots;

providing a set of N payload module configurations, wherein the set of N payload module configurations is characterized by a sequential addition of a payload module into each of the plurality of payload slots, wherein the sequential addition of the payload module couples the payload module to the network; and

remapping the N number of payload interfaces to the switch configuration such that a latency function is minimized, wherein the latency function is a function of the switch configuration and the set of N payload module configurations.

10. The method of claim 9, wherein the latency function is a root-mean squared latency function.

11. The method of claim 9, wherein the latency function is an arithmetic mean latency function.

12 The method of claim 9, wherein the latency function is a normalized root-mean squared latency function.

13. The method of claim 9, wherein the latency function is a normalized arithmetic mean latency function.

14. The method of claim 9, wherein the sequential addition comprises a first end to a second end sequential addition.

15. The method of claim 9, wherein the sequential addition comprises a second end to a first end sequential addition.

16. The method of claim 9, wherein the plurality of switching elements comprises M number of switching elements coupled to the N number of payload interfaces, wherein each of the M number of switching elements has a plurality of ports, and wherein the sequential addition comprises populating all of the plurality of ports on one of the M number of switching elements, one of the M number of switching elements at a time.

17. A method of optimizing a network, comprising:

providing a switch card topology having a plurality of switching elements, wherein the plurality of switching elements are arranged to form a switch configuration;

providing N number of payload interfaces coupled to the switch configuration, wherein each of the N number of payload interfaces is coupled to interface with one of a plurality of payload slots;

providing a set of N payload module configurations, wherein the set of N payload module configurations is characterized by a sequential addition of a payload module into each of the plurality of payload slots, wherein the sequential addition of the payload module couples the payload module to the network;

calculating a plurality of remapping functions for the set of N payload module configurations; and

selecting one of the plurality of remapping functions to minimize a latency function, wherein the latency function is a function of the switch configuration and the set of N payload module configurations.

18. The method of claim 17, coupling the N number of payload interfaces to the switch configuration according to the one of the plurality of remapping functions selected to minimize the latency function.

19. The method of claim 17, wherein the latency function is a root-mean squared latency function.

20. The method of claim 17, wherein the latency function is an arithmetic mean latency function.

21. The method of claim 17, wherein the latency function is a normalized root-mean squared latency function.

22. The method of claim 17, wherein the latency function is a normalized arithmetic mean latency function.

23. The method of claim 17, wherein the sequential addition comprises a first end to a second end sequential addition.

24. The method of claim 17, wherein the sequential addition comprises a second end to a first end sequential addition.

25. The method of claim 17, wherein the plurality of switching elements comprises M number of switching elements coupled to the N number of payload interfaces, wherein each of the M number of switching elements has a plurality of ports, and wherein the sequential addition comprises populating all of the plurality of ports on one of the M number of switching elements, one of the M number of switching elements at a time.

26. A method of optimizing a network, comprising:

providing a switch card having a plurality of switching elements, wherein the plurality of switching elements are arranged to form a switch configuration;

providing N number of payload interfaces coupled to the switch configuration, wherein each of the N number of payload interfaces is coupled to interface with one of a plurality of payload slots;

providing a set of N payload module configurations, wherein the set of N payload module configurations is characterized by a sequential addition of a payload module into

each of the plurality of payload slots, wherein the sequential addition of the payload module couples the payload module to the network;

calculating a plurality of remapping functions for the set of N payload module configurations; and

minimizing an all-to-all transfer time in the network by selecting one of the plurality of remapping functions to minimize a latency function, wherein the latency function is a function of the switch configuration and the set of N payload module configurations.

27. The method of claim 26, coupling the N number of payload interfaces to the switch configuration according to the one of the plurality of remapping functions selected to minimize the latency function.

28. A method of optimizing a switch card, comprising:

providing a plurality of switching elements, wherein the plurality of switching elements are arranged to form a switch configuration on the switch card;

providing N number of payload interfaces coupled to the switch configuration, wherein each of the N number of payload interfaces is coupled to interface with one of a plurality of payload slots;

providing a set of N payload module configurations, wherein the set of N payload module configurations is characterized by a sequential addition of a payload module into each of the plurality of payload slots, wherein the sequential addition of the payload module couples the payload module to the network; and

coupling the N number of payload interfaces to the switch configuration such that a latency function is minimized for the switch configuration and the set of N payload module configurations.

29. The method of claim 28, wherein the latency function is a root-mean squared latency function.

30. The method of claim 28, wherein the latency function is an arithmetic mean latency function.

31. The method of claim 28, wherein the latency function is a normalized root-mean squared latency function.

32. The method of claim 28, wherein the latency function is a normalized arithmetic mean latency function.

33. The method of claim 28, wherein the sequential addition comprises a first end to a second end sequential addition.

34. The method of claim 28, wherein the sequential addition comprises a second end to a first end sequential addition.

35. The method of claim 28, wherein the plurality of switching elements comprises M number of switching elements coupled to the N number of payload interfaces, wherein each of the M number of switching elements has a plurality of ports, and wherein the sequential addition comprises populating all of the plurality of ports on one of the M number of switching elements, one of the M number of switching elements at a time.

36. A method of optimizing a network, comprising:

providing a switch card having a plurality of switching elements, wherein the plurality of switching elements are arranged to form a switch configuration;

providing N number of payload interfaces coupled to the switch configuration, wherein each of the N number of payload interfaces is coupled to interface with one of a plurality of payload slots;

providing a set of N payload module configurations, wherein the set of N payload module configurations is characterized by a sequential addition of a payload module into each of the plurality of payload slots, wherein the sequential addition of the payload module couples the payload module to the network; and

reordering a sequence of adding the payload module into each of the payload slots such that a latency function is minimized, wherein the latency function is a function of the switch configuration and the set of N payload module configurations.